Disruptive Effects of Demand Responsive Transport (DRT) Systems on Mobility

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Introduction

• DRT systems (aka paratransit services) are tailor-made public transportation systems in which the stops’ locations and times are requested by the passengers.
• DRT is expected to be the potential solution for unprofitable Conventional Public Transport (CPT) in low-demand areas.
• Many studies tried to model and predict the impacts of this system on mobility.
• No modelling with dynamic routing algorithm in previous studies for comparing DRT and CPT.

Objectives

• Identifying the critical demand, lower than which the DRT outperforms CPT
• Searching for evidence to demonstrate the impacts of DRT on user’s quality of mobility.

Methodology

• 2 Different Network Shapes
• 3 Different Conventional Public Transport (CPT) Services and DRT
• 7 Different Demand Densities

Results

Figure 1: user performance in star-shape (left) and grid (right) network. It is shown that DRT provides the minimum VIVT (i.e. perceived travel time by passengers) and in turn a higher performance for passengers.

Table 1: The highest demand, at which the cost difference between DRT and the corresponding CPT is less than 10%.

Conclusions

• Replacing CPT with DRT leads to an increase in people’s mobility due to reduction in their perceived travel time.
• 3 requests per minute (or 11 requests/hour/km²) is the critical demand overall.
• The cost of DRT operation is independent from network shape and depends mainly on demand level.
• Grid network provides a better situation for DRT operation.